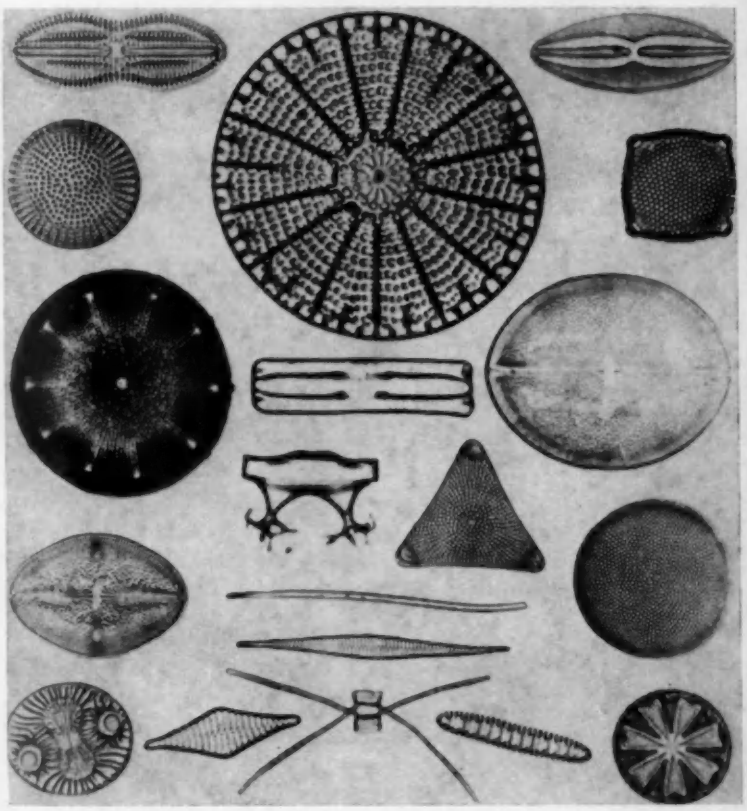
# Earth Science

Rockhounds' NATIONAL Magazine



"Photomicrograph of fossil diatoms from the Lomoc deposits. A girdle-view of one species is shown near center of the picture." (See page 9)

35¢

March-April, 1957

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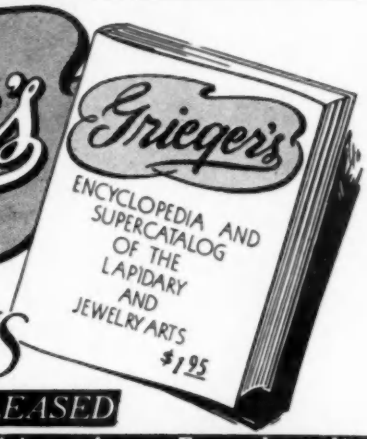


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# Earth Science

$2 a Year

Vol 10, No. 2

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CONTENTS, MARCH-APRIL, 1957




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# EDITOR'S MEMO PAD

WE WERE IMPRESSED with the several opening statements made by Harry L. Woodruff in his "President's Letter" sent out the first of the year to the Officers and Clubs of the American Federation of Mineralogical Societies, which we quote:

"As we set sail on the sea of a new year, let us pause long enough to rededicate ourselves to our hopes and desires.

"The finest resolve may vanish into thin air unless it is accompanied by sturdy application and a continuous effort unbiased by personal gain.

"Let us be ever mindful of our responsibility to our duties as officers and lay members of one of the finest groups of men and women ever to band themselves together under the name of a hobby.

"I wish to pay tribute to the fine men and women who officered and guided our American Federation through these ten years of our existence. It is from these members that we must take our determination to continue to build on the solid foundation they laid down."

These are inspiring thoughts, are they not, beautifully stated and equally applicable we feel not only to the officers of the Regional Federations, but also to those of all local societies and clubs, as well. The signal success of any organization depends, it seems, first upon its high purposes and objectives, and next upon the ability of the officers, and their steadfastness in working to put these ideals into practice. No society can be expected to function successfully if its officers approach their job in a halfhearted, lukewarm fashion.

More could be said on this subject, but this brings us up to an observation which we cannot refrain from making, that we think is especially appropriate at this time of the year when many clubs will soon be looking forward to electing a new staff of officers to take over for another year. Without doubt the most important committee of any organization is its nominating committee, the next is the program committee, and then the membership. The nominating committee should be very careful to choose only those nominees for office who are wide awake, "up and coming," and willing to take on their job with a degree of enthusiasm that will be contagious.

This we know is sometimes a hard thing to do. We know of clubs where in desperation folks have been elected to office without ever having been asked if they would accept and take over. Then, too, there are cases where folks have accepted the nomination knowing full well that they would get by by doing just as little as the "law will allow." Happily in most cases this is not true, and the success and growth of our great hobby, itself speaks well for the high quality of the officers that are now, and have been, in charge of the work,—and this is enough to be said upon this subject.

## PERSONS & EVENTS

1957 NATIONAL GEM AND MINERAL SHOW. —In connection with the action of the A.F.M.S., as you no doubt already know, Denver has been chosen as the site of the American and Rocky Mountain Federation joint convention for 1957. The host society is the Colorado Mineral Society, and the dates have been set for June 13, 14, 15 and 16th. Something new has been added this year, and an event which has previously been known as a convention will be known as the "1957 National Gem and Mineral Show," for that is what it really is, and it is thought that the new name will add prestige and enthusiasm which will aid in the publicity and make it seem like a bigger attraction. We approve.

The location for the show has been definitely established at the Colorado National Guard Armory, located at East Third Avenue and Logan Street, Denver. The accommodations for the dealers and show will be ample, and the cases for exhibitors will be adequate.

There will also be ample parking space in the vicinity as well as hotels, motels and camping sites. Most of the committee chairmen have been appointed and are as follows: General Chairman, Mr. James Hurlbut; Buildings and Grounds, Mr. Philip Earlhardt; Program, Mrs. Betty Hurlbut; Publicity, Mr. and Mrs. Ernest E. Parshall; Exhibits, Mr. Arthur Ermish, and Dealers, Mr. Calvin Simmons.

All correspondence, except pertaining to dealers and exhibitors, should be addressed to: National Gem and Mineral Show, 1957, 2620 S. Pearl Street, Denver 10, Colo.

*

A letter has recently been received from MR. HOWARD L. COOPER, 2073 Crozier, Muskegon, Mich., stating that a new Mineral Society is being organized in this progressive city located on the east shore of Lake Michigan, opposite Milwaukee.

Your editor extends felicitations, and suggests that our Midwest bulletin editors, by way of encouragement, place the new club on their mailing list, as we are certain that they will want to affiliate with our Federation at their earliest convenience.

*

Identification and the distinctive qualities of certain minerals and gem stones will be the subject of a panel discussion at the March regular meeting of the ST. LOUIS MINERAL AND GEM SOCIETY to be held at the St. Louis County Library, 6814 Natural Bridge Road.

Panelists will be drawn from members of the society according to R. M. Edwards, president. A highlight of the program will be a discussion period during which time the audience will be permitted to direct questions concerning the subject to any or all members of the panel, Mr. Edwards said.

The American Federation of Mineralogical Societies announces an ESSAY CONTEST FOR JUNIOR ROCKHOUNDS. Here are the rules:

(1) Any junior member (or any regular member who is sixteen years of age or under on May 1, 1957) of any club which is a member of the American Federation through a regional federation, may enter.
(2) Each entry shall be entirely the work of the junior member submitting it.
(3) The subject of the essay shall be "Ethics of a Rockhound," and it shall be not over 2,000 words in length.
(4) Each entry must be accompanied by a statement from the secretary of the sponsoring club, stating that the author is a junior member in good standing.
(5) All entries are to be mailed to:
Vincent Morgan
P.O. Box 542,
Boron, Calif.
The deadline for entries is May 1, 1957.
(6) Prizes are a $50 U.S. Savings Bond for first prize, and a $25 bond for second prize. Winners will be announced at the American Federation Convention in Denver, June 13-16.
(7) The decision of the judges is final.

*

"BILL" BARTLETT, sponsor of the Winnebago Rock Club of Oshkosh, Wis., reports that their club is now trying out an innovation, which he thinks might work out very well with other small groups where full scale organization has not yet been put into operation. Until further notice each club member will now take his turn and be entirely responsible for a single meeting, arranging the program, securing the speaker, the place of meeting, either in the home or elsewhere, notifying the members, and believe it or not furnishing the refreshments.

The meeting dates are also to be flexible, so that if they happen to run into some serious conflict or other obstacle, securing film reservation for instance, the meeting can be set up for another time. The idea is meeting with local approval and stimulating interest,—variety being the "spice of (club) life."

At the last meeting held at Ed Coumbs', Dick Fortan, a former member, gave a very interesting talk on Wisconsin fossils. Here then, we feel, is a suggestion which might appeal to other small groups in process of organizing.

*

The following "IMPORTANT NOTICE OF THEFT" comes to us for publication from V. B. Meen, Curator of Geology and Mineralogy of the Royal Ontario Museum of Toronto, stating, that "the Mineral Collections of the Museum were looted during the night of January 14-15, 1957, of most of the display specimens of native gold. In addition, four small faceted diamonds were taken, and many other items not yet determined."

"If during the next few months," states Mr. Meen, "you should be offered any specimens which might fit the descriptions I would be grateful if you would inform me." An itemized list may be had by those wishing more detailed information, upon request by writing Mr. Meen at the Museum,—address 100 Queen's Park Crescent, Toronto 5, Ontario, Canada.

*

JAMES K. DAVIS of the Chicago Rocks & Minerals Society informs us that a giant jade nugget weighing 20 tons has been found and is stored in Kotzebue, Alaska, awaiting a buyer. The huge stone, 16 feet high and 5 feet through, was recently hauled from Jade Mountain, 200 miles away, in five days. It was mined by the Imperial Jade Company, which will not sell it for stone settings. (It would make some four millions of them.) Gene Joiner of the company says it will be only sold intact to someone to use as a statue or monument,—"what are we bid?"

*

SILICON SCORES AGAIN. Now we read of a new waterless car battery, which is claimed by the manufacturer to be good for some half million car starts and is guaranteed for 10 years, being made in California,—and where else might any one expect such a wonderful thing to happen anyway? What we are interested in, however, is the fact that this new battery uses a sealed-in silicon electrolyte, and while it never needs water, it will produce from 6 to 12 volts of electricity for an indefinite period of time.

Silicon, the second most plentiful of all the elements, and one of the principal components of the mineral Quartz ($SiO_2$), may yet prove to be one of the most valuable of all of the common elements.

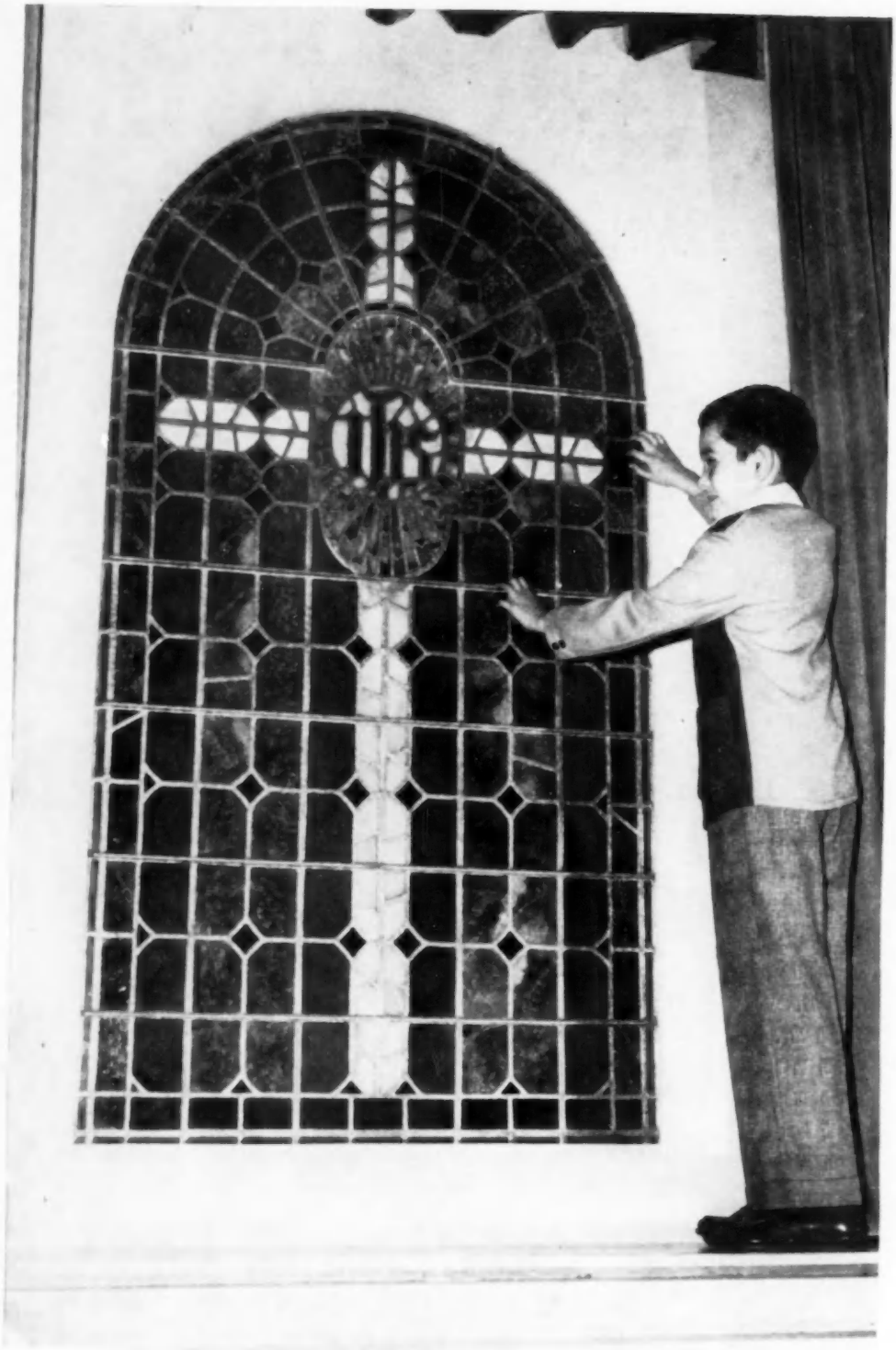
*

HOW TO COLLECT SHELLS. — There is scarcely a mineral collection today that does not contain at least a few shells,—and why not, for most of our common fossils originated as shells, and fossil and mineral collecting often, or should, go hand in hand. If those who have shells in their collection should like to know more about them, we would advise that they investigate the publications of the AMERICAN MALACOLOGICAL UNION, with headquarters at the Buffalo Museum of Science, whose address is Humboldt Park, Buffalo 11, New York.

*

FAMOUS KRAFT JADE WINDOW SAVED.—Fire raced throughout the old Chapel building of the North Shore Baptist Church, 5244 Lakewood Avenue, Chicago, on Sunday morning, February 10, damaging the church property to the extent of some $50,000. Most fortunately the famous Kraft Jade window, which has been so widely publicized, was located in the newer portion of the church edifice which was damaged only by smoke and water.

This irreplacable and priceless work of art (for a complete description of which see the November, 1952, issue of EARTH SCIENCE) was fashioned by the late J. L. Kraft, founder of the Kraft Foods Company, from 446 separate thin section pieces of American jade. Mr. Kraft, who was considered an authority and expert on the working of jade, spent several years and many thousands of dollars in the construction of this fabulous window.



KRAFT JADE WINDOW

* * *

## LETTER

4001 Sand Hill Rd.,
Springfield, Ill.,
February 26, 1957

DEAR SIRS:

I wish to make application for life subscription to EARTH SCIENCE. Enclosed is money order for $50 to cover cost of the subscription.

I recently completed the course in mineralogy of the Mineral Science Institute, of Chicago, and found it very educational and absorbing.

I am hoping you will accept this application.

Sincerely yours,
THEODORE C. E. REICH, SR.

* * *

## AUTHORS

BERNARD W. POWELL, of the National Association of Science Writers, resides at Glenbrook, Conn. His pictures are by courtesy of Johns-Manville Corporation. WILLIAM H. ALLAWAY, of our staff, needs no introduction to rockhounds. E. D. CORNWELL, of Chicago, is a chemist. He is associated with Armour & Company, and not Western Electric, as erroneously stated here previously. TOMASZ J. TURLEY is a geologist and formerly was a college professor in Poland. After fleeing from his homeland, he first found refuge in West Germany, where he taught science in a Polish lyceum (college). Finally, with his wife in 1951 he reached Chicago, where he is becoming readjusted and following his profession.

—BEN HUR WILSON, *Editor*

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## BOOK REVIEW

"ARIZONA'S METEORITE CRATER," by H. H. Nininger, World Press, Inc., Denver, Colo. 232 pages. $3.75.

Every rockhound should be interested in reading this informative and authoritative book by Dr. H. H. Nininger, upon this most controversial subject which for more than 80 years, since the crater's discovery, has been the subject of almost continuous debate. It was first explained as a "steam blow-out crater" and the meteorite fragments scattered all about it were dismissed as "coincidental." Later it was recognized as having been formed by meteoritic impact and a search was begun for the meteorite believed to rest deep within it.

In "Arizona's Meteorite Crater," Dr. Nininger presents for the first time anywhere the complete story of all researches undertaken to solve the mystery—the discovery of the crater and the shattered meteorite fragments, the early attempts to prove geological origin, the drilling operations, and the latest startling discoveries made by Dr. Nininger himself.

Dr. Nininger is no desk-bound theorist. He has spent more hours in field and laboratory research on meteorites than any other man in history. He is the father of modern methods of field research. These methods applied to the Arizona meteorite crater have been abundantly fruitful.

This book, which is thoroughly annotated and illustrated, should be on the shelf of every one interested in the subject of meteoritics.

—B.H.W.

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## INDEX TO ADVERTISERS



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These ads for ev'ry rockhound need.
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The more of them will want to tell
Their stories—and this book wax fatter
—More pictures and more reading matter!

— ROBERT ROCKHOUND

Earth Science

MARCH-APRIL, 1957 Vol. 10, No. 2

# Fossil Diatoms

*by* BERNARD W. POWELL

## I.

*Paleontology: Window Into The Past*

WHO IS NOT MOVED at the thought that hard and stony fossils once pulsed with life? The fire and hue were not always in the opalescent bone—once it lived and grew, perhaps supporting some ponderous saurian where he floated in a slimey Cretaceous swamp. The forever-sealed valves of fossil brachiopods parted rhythmically beneath Silurian seas as their inhabitants siphoned sustenance from the water. Think of the exquisitely arrested struggles of a mosquito in Baltic amber — the delicate imprint of a dragonfly in the Solenhofen limestones. No more the rapid, erratic, darting flight, the nervous hovering among horsetail rushes of Mesozoic marshes — their forms are eternally stilled, transfixed in time.

Of all the earth sciences, paleontology best reveals Nature in her role as The Experimenter. Contained in the world's rockstuffs is an incredible record—that of organic evolution. The deciphering and study of this record is one of the most rewarding pursuits. We see from afar those other times when animals and plants strangely unlike those of today dominated the living scene. We learn of burgeoning populations whose numbers overtaxed their food supply and brought on their wholesale demise. As they waned — another group waxed and progressed steadily towards its flowering. And there is always the ceaseless experimentation: unending trial—now it is the sea to which the forms adapt, now it is the desert, the forest, the black muck of indescribably fetid sloughs, or again the barren, grey-white wastes of the polar regions or the boundless regions of the sky. With hook and claw, fin and wing, bony plate and stereoptic vision—Life's species go forth again and again to try an environment. Dying, they leave behind shells, bones, teeth and imprints that record the continuing drama of organic existence. Impersonally, with bio-statistics, we men describe and circumscribe whole races, orders and species. We fancy we see broad general plans, repeated attempts at similar modifications. But at the back of our mind gnaws always an uncomfortable thought: we cannot find an orientation for life—a goal. In a thousand ways the insensate opportunism that is Life creeps in to blur our petty human theories and we are forced at last to admit that there is no single goal toward which Life progresses. Man is not the "culmination" of *all* life, he is only the most refined member in one direction of descent. Before his day, contemporary with it, and long after he perishes, other beings with whom he shares this globe have in the past, do now, and will in the future pursue their own special destinies. If we would understand the smallest fraction of Life, we must think on the other species in the animal kingdom that have gone before . . .

We may if we choose, go down to the level of the individual—the forgotten, anonymous one, whose like a thousandfold over makes up the paleontologists' "world populations." From beneath the sediments, within the stone, we raise him up from his eternal grave and bring him once more to light. But here reason recedes, our hearts

go out as humans—as fellow beings—to some particular sabertooth of the Pleistocene whose plight touches us, or we stand contemplative before the diseased and pain-twisted bones of a dinosaur. Somewhere is recorded the skull of this sabertooth *(Smilodon)* taken, I believe, from the Rancho La Brea tar pits near Los Angeles. One of those hunting cats who prowled the forests of the Ice Age, the sabertooth killed by springing upon the back of hapless victims and driving great dagger-like incisors deep into the animals' vitals. Imagine our specimen here if you will. An untoward incident had robbed him of his precious incisors. Snapped clean at the gum line, their loss sealed his fate. No more the hunt, the careful up-the-wind stalking of fleet prey—the sinuous bunching of powerful muscles and the mighty spring with head up and deadly sabers outthrown. The hunter whose yowls had echoed among the bluegreen ice cliffs of the glaciers, was reduced to a catcher-of-rodents, a stalker-of-rabbits. Like a modern housecat, he sprang on tiny birds. He must have skulked endlessly in the brush around the tar pits—seeking always the innocuous little animals upon which he now fed and which never really filled him. Starvation drove him and he abandoned the native caution of the cats. One day a fat, young buck strayed out upon the surface of a tar seep. Within seconds he was mired to immobility in the treacherous substance. So it was the sabertooth found him, and sensing a full meal at last, ventured toward the buck. At once the viscous, sucking tar had him in its grasp. Minutes later both he and the buck he never ate had vanished forever beneath the sticky, oily surface.

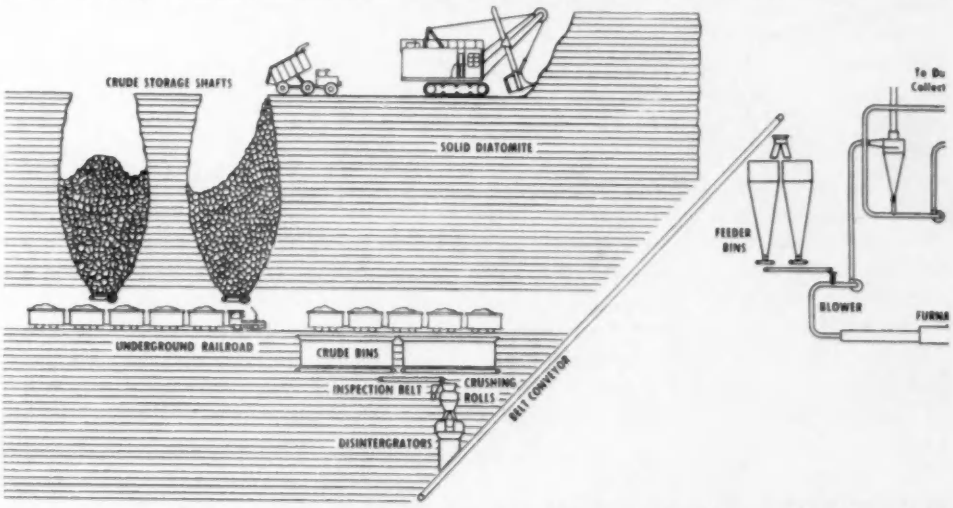
Extent of the Miocene sea over parts of California is shown by the shaded area. Marine diatoms grew here in profusion at that time and left behind vast fossil beds composed of their siliceous cell walls.

*Tyrannosaurus rex* was the most fearsome carnivore that ever strode the earth. He lived millenia before our sabertooth—back in Cretaceous Times—the paleontologist's "Age of the Ruling Reptiles," the age of the dinosaur. A proud hunter he, too. His shearing, tearing teeth could seize and devour almost any other animal of his day. He was the master of his era and none was his match. The fossilized jaw of a tyrannosaur was once set up and a man on a Shetland pony rode through the open teeth! Surely such a formidable monster had little to fear. Yet there is on exhibit the vertebral column of a tyrannosaur that moves even the impersonal paleontologist to pity: the bones are calcified and stiffened, and show that this particular individual suffered the agonies of an arthritic spine. True, he was only an anonymous individual far back in the evolution of Life. Yet he must have suffered greatly. . . . As men, we perhaps think that pain is our own birthright; in truth it has tortured the living parade since earliest times. Its very prescence is proof of sensible being; its recognition draws man and beast closer in the adventure of living.

For the student of the earth sciences the rocks are filled with such hidden tales. We may follow the tracks of the hunter

as he stalks across muddy flats on the trail of his prey, we may marvel at the imprint of passing raindrops that fell in ancient showers so long ago. We may gather seeds now stone and which shall never sprout in sun and soil. A chance blow of

Open pit quarrying was the forerunner of modern mining methods in the diatomite beds of southern California. Modern industry has many uses for diatomite in a range of widely diverse products.




The demand for refined diatomaceous earth grows yearly; contrast this diagram of modern mining practices with the view of the horse-and-wagon quarry operations of yesteryear.

the hammer may reveal a fin that no more shall try the currents of vanished seas—limbs, sightless eyes and frozen jaws are waiting locked in the sediments for those who seek. . . . I shall very briefly relate the story of the *Diatomacea,* microscopic plants whose fossil forms bloom as precise, geometric designs of incredible complexity and design when viewed beneath the lens. Beside the gastroliths, the leaf imprints, the shells, bones, teeth and marvelous casts that constitute the fossil record of all life, the diatoms take their place. The serious amateur geologist will find collection, preparation, and study of them a challenging project.

### *What Are Diatoms?*

Diatoms are microscopic, acquatic, single-celled algae or plants. As individuals they are invisible to the naked eye but are immediately recognizeable in large numbers as gelatinous colonies or growths in both fresh and saltwater everywhere. Living diatoms are common throughout the world today and collections may be taken in roadside ditches, ponds, or tidal marshes. However, we are here concerned mainly with the ancestors of these modern forms. Fossil diatoms occur as deposits of diatomaceous earth—also called diatomite, infusorial earth, and kieselguhr. These deposits are often quite extensive and are worldwide in occurrence. They have been mainly linked with Miocene and Pleistocene times in age. In the United States, noteworthy deposits of diatomaceous earth occur at Richmond, Virginia, in the Chesapeake Bay area and Maryland, and in Connecticut, New Hampshire and New York in the Northeast. But the outstanding deposits are in the West, and those of the Lompoc region in California are extremely pure and widespread. I shall describe this particular formation later, as it is an outstanding deposit.

Diatoms are well known to microscopists of all ages, and apparently have been ever since old Anton Van Leewenhoek — the father of scientific microscopy — first discovered them over three hundred years ago. Diatomists have been humorously dubbed "diatomaniacs" by fellow microscopists. Considering the esthetic appeal that these beautiful little objects have, and the immense number and variety of them, this is not surprising. What is, is that so few students of the geological sciences have collected and studied these forms. As will be shown, gathering and preparation of the fossil types has many advantages over collecting living forms (which is mainly what microscopists do). I shall describe how to prepare and mount fossil diatoms shortly. It is sufficient to note that no expensive or complicated apparatus is needed. All that anyone really interested in the subject needs is a low-to-medium power microscope. So many of these are now offered—and at attractive prices, too—that I will assume that every amateur geologist will certainly have one, or is able to secure one.

*(To be continued)*

(May-June issue—II. Structure of the Diatom, Diatoms and Mankind, The California Deposits, July-August issue—III. How to Secure Fossil Diatoms, How to Prepare Specimens for Study and Display.)

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### Comstock Diggings To Be Reopened

There is scarcely a rockhound alive today who has not heard of the fabulous Comstock Lode, or of Virginia City, Nev., whose history reads more like fiction than fact. And now we hear that these low grade veins are to be worked again, and to do so a multi-million dollar hole in the ground is to be reopened. This Comstock lode in Nevada was the producer of vast wealth in gold and silver during a lusty period of American history.

One of the richest mining areas ever developed, the Comstock helped finance the North in the Civil war, provided the basis for several American fortunes, rejuvenated San Francisco and lifted California from a depression. As operations declined, the Comstock left on its doorstep one of the most famous of ghost towns, Virginia City.

The consolidated Virginia Mining Com-

pany, one of the best known names on the Comstock in its biggest boom period, the 1870's, recently announced it will resume work, developing with modern methods low grade ore deposits unprofitable in earlier days.

Discovered in 1859 by a group of placer miners, the lode lies between two rock faces in western Nevada. It was formed perhaps 60 million years ago, geologists believe, by the upwelling of subterranean fire and steam. These earth fires still burn beneath the lode. Water as hot as 170 degrees Fahrenheit, gushing into the shafts, stopped deep mining efforts at the 4,000 foot level.

The men who worked these deep mines, sometimes in niches so hot their bodies had to be sprayed with cold water, sought boisterous recreation on the surface.

Although more decorous than many mining camps of the period, Virginia City had its moments of excitement. Memorable was the opening of the first opera house which, with its successors, was to provide a showcase for such stars as Modjeska, Joe Jefferson, Buffalo Bill, Lotta Crabtree, and Edwin Booth.

Gold and silver from the Comstock started many men toward wealth, among them George Hearst, father of the late publisher, William Randolph Hearst. The group that profited most consistently from the Comstock however was the brokers who handled the stocks. — *Chicago Tribune* Press Service.

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# The Meteorite Shower at Pultusk

*In the Light of Recent Studies*

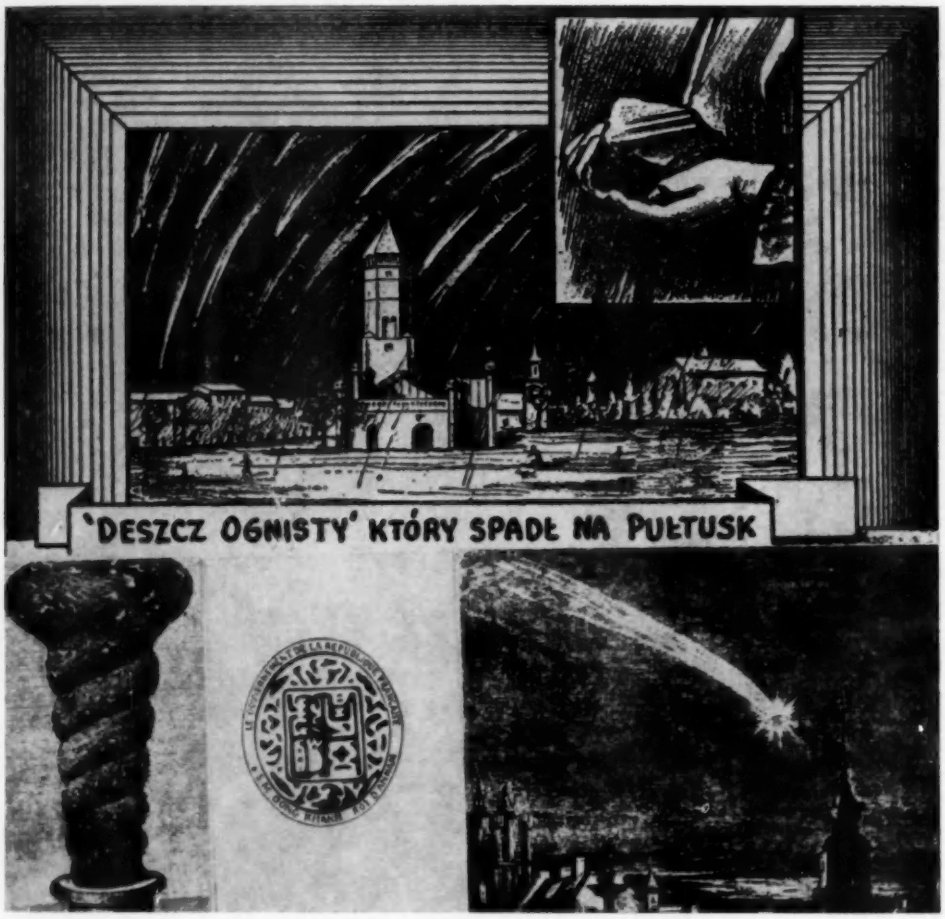
*by* TOMASZ J. TURLEY

NEARLY NINETY YEARS have elapsed since the great meteorite shower occurred at Pultusk, near Warsaw in Poland, on January 30, 1868. While it has always been considered one of the greatest and most important "showers" of all time, it has in the light of more recent studies assumed even greater prominence than it formerly had.

Not much was known concerning meteorites one hundred years ago, as the science of meteoritics was then not even in its infancy. I was greatly surprised, therefore, on arriving in Chicago a few years ago, to find that one of the very first descriptive articles of the great Pultusk shower had been published by an American scientist, Dr. Lewis Feuchtfanger, in the "Proceedings of the American Association for the Advancement of Science," having been read at a meeting held in Chicago in 1868, the very year of the fall.

I note here a part of the description of the meteorite according to Dr. Feuchtfanger: "On a starlight night the citizens of Warsaw gazed petrified with fear on the rapid approach of an immense ball of fire, which at last bursted over their heads with a noise and shock such as never heard or felt before on the surface of the earth . . . during the fall the fiery meteor had exploded in the atmosphere into about 100,000 fragments (now more nearly estimated to be around 68,000) and like a shower of stone had spread over the territory surrounding Pultusk." (It is interesting to note here that following the well known shower occurring in this country at Holbrook, Arizona, in 1912, only about 16,000 stones were collected.)

Fragments of the Pultusk meteorite shower are to be found in all of the famous museums of America and Europe, and an especially large and interesting display may be seen in the collections in Meteorite Hall of the Chicago Natural History Museum. Scientific articles upon it have been pub-




*Above*—The Fall of the Pultusk Meteorite Shower (from a drawing by Henry Archacki). *Below, left and center*—Unusual use of a Fragment of Pultusk Meteorite: The Seal of Dong Khan, King of Annam, Former French Protectorate, Was Made from a Fragment. According to Mineralogist Stanislav Meunier, the French Government Gave It to King Dong Khan, "Son of Heaven," as "a Thing Which Came from the Sky." *Below, right*—Pultusk Meteor as Seen in Warsaw, Poland (from an old photograph by S. Kramsztyk).

Photograph (by permission of Chicago Natural History Museum) Shows Collection of Pultusk Meteorite Shower Fragments.

lished in many languages, there being more than thirty publications listed in the "Bibliography of Meteorites" by H. Brown, 1953, one of which, in the "Geological Series of the Field (now Chicago) Natural History Museum, 1943," should be readily accessible to any who might wish to consult it.

While meteorites, the so called "Messengers from Heaven," were formerly considered more in the light of curiosities to be displayed and admired as museum specimens, as the science of meteoritics grew and developed, it was agreed that they, being the only tangible materials we have to work

with from outer space, were important as aids in the determination of the origin of the Solar System, and likewise as valuable aids in explaining the true nature of the Cosmos, as well. It so happens that with all these problems in mind, among the many meteorites which have been examined by scientists, remnants of the great meteorite shower of Pultusk are among the most promising yet studied.

Among other things to be considered in the study of meteoric materials, is their probable origin, whether it be strictly Solar or Cosmic; their chemical and physical properties, and their age as it may be inferred by their radio-active disintegration.

During the past twenty years of much progress made in the physical and chemical branches of meteoritical research, their radioactivity was measured and their helium content tested, making possible new determinations of their composition, age and origin, and therefore that of the Earth.

For their new investigations many American scientists have chosen to experiment with the meteorite of Pultusk, because this belongs to the rare phenomenon of meteorites whose orbit is most accurately calculated. In 1943 Dr. Robley Evans, of the Massachusetts Institute of Technology, estimated that the Pultusk meteorite was two billion years old, and concluded that the atoms of matter of the meteorite are the same age as the oldest rocks of the Earth's crust. Since then, in 1955, according to Dr. H. C. Urey, of the University of Chicago, the age of the meteorite has probably been stepped up to approximately four and one-half billion years, which more nearly correlates with other known facts concerning its age.

Thus the study of meteorites, or petrified fragments of Cosmic matter, helps explain the composition and determine the age of the Solar System, and all rockhounds wherever they may live should scrupulously guard and see that all meteorite fragments that come into their possession be carefully preserved for the benefit of science.

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## ROCK-HOUNDS, — WATCH FOR METEORITES!

Nothing adds to the interest of one's collection more than a good meteoric specimen, "minerals from heaven," as they have been spoken of, having fallen to earth from outer space, from no one knows exactly where. Rockhounds, while on field trips, collecting minerals, or while hunting or plowing should constantly be on the alert for stones with a dark crust. Most freshly-fallen stone meteorites have a black crust, with a definitely lighter interior. Look for shallow depressions like "thumb prints." (Fig. 1, or Fig. 2.) These are characteristic of meteorites. Meteorites are solid, and heavier than most ordinary rock.

If you hear of a stone falling in a field as a dark streak, with dust flying, that sounds like a meteorite; or if you hear of someone digging a stone from a hole from which fresh dirt was thrown, that sounds interesting, especially if a big meteor has just fallen; so please investigate.

Meteorites are covered with a thin fusion

*Fig. 2.* Stone Meteorite (broken) that Fell Near Amana, Ia., February 12, 1875. (Courtesy of Prof. C. C. Wylie, State University of Iowa.)

crust due to extreme heating during their flight through the atmosphere. This crust is nearly or quite black in most meteorites at the time of fall. Later it becomes brown (rust) from oxidation if exposed to the weather.

They are generally irregular in form—almost any shape. They are often pitted more or less. The corners and edges are notably dulled or rounded. A few meteorites are conical in shape.

They nearly always contain an alloy of nickel-iron. This metal may be in small grains embedded in a stony matrix or it may constitute almost the entire meteorite. In either case it can be detected by grinding a corner of the suspected specimen against an emery wheel, which will reveal bright white metal. Any somewhat irregular piece of iron which does not appear artificial, should be examined. (Fig. 3.) Many more stone meteorites fall, but more irons are recovered because they are so easy to distinguish. A magnetic test should be made for iron, but a chemical test must be made to reveal the presence of nickel.

In watching for meteorites, disregard all porous or cindery formations, as no meteorites are of that type. Disregard the rocks picked up in the area of burned grass. Meteorites are never hot when they strike. Disregard also the stones picked up where a ball of fire seemed to strike at night. The ball-of-fire appearance ends while the meteor is still several miles high, so if the meteor seemed to fall as a streak of fire just behind a nearby tree, it must in reality have been fifty or more miles away.

One can generally, but not always, reject at once stories of meteorites weighing twenty-five or more pounds being found lying on top of the ground. In ordinary pasture

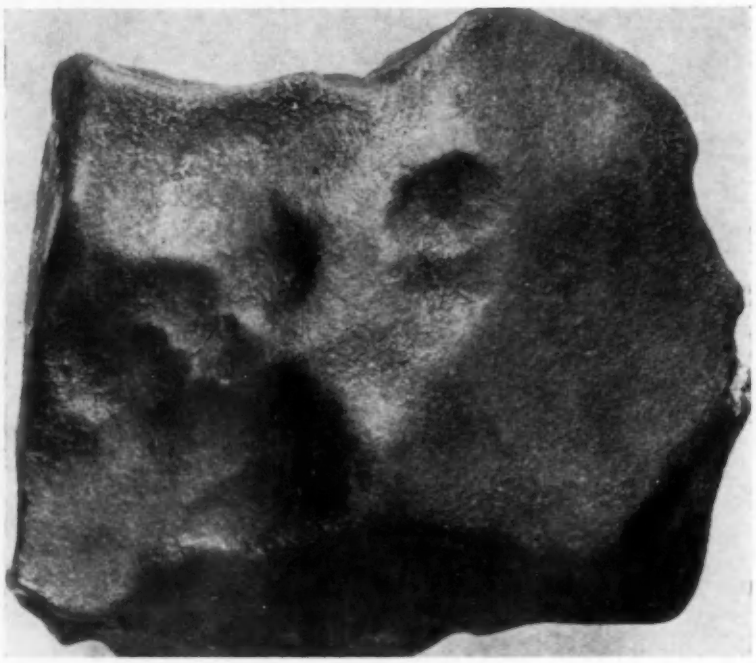

*Fig. 1.* Stone Meteorite that Fell at Benld, Ill., September 29, 1938, and Is Now Exhibited in a Special Case in the Chicago Natural History Museum. (From a Photograph by Frank M. Preucil who, with Editor Ben Hur Wilson, Made the Original Investigation and Discovery of This Famous Meteorite.)

*Fig. 3.* Iron Meteorite from Meteor Crater, Ariz. Date of Fall Unknown. (Courtesy of Prof. Wylie.)

land a stone weighing fifty pounds would drive down about two feet. But a meteorite weighing seventy-five pounds was found lying on top of the ground because it fell in deep snow when the ground was frozen. The melting of the snow left it exposed. A meteorite weighing 1,300 pounds was found largely on top of the ground, but broken into pieces. It had struck in shallow soil over hard rock, which stopped the meteorite but broke it.

Remember meteorites do not come to the ground in a burning condition. They do not set fires. They burn while high in the air but generally cease burning about 5 to 20 miles above the ground. They are not light porous rocks, and they are not round like a ball and they are not hollow.

Astronomers specializing in the study of meteorites are of the opinion that some meteorites fall each year in practically every state, but in many no meteorites have been recovered for more than fifty years. This probably is because hardly one person in a thousand would recognize a meteorite if he saw one lying in a field. Meteorites are of value in certain types of research work, so we hope that more persons who are outdoors regularly will learn to recognize them. In case of doubt about any rock that is suspected of being meteoric, hand it on to some authority on meteoritics to decide. It may be a very valuable specimen, valuable to you and valuable to science.

—B.H.W.

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CELTIC CROSS MADE OF MOTHER-OF-PEARL.—Inlay artist Joseph Phetteplace, of Wauzeka, Wisc., nationally famous for his superb mosaic "Man-O-War," made of semi-precious gem stone material, and other equally fine works in Mother-of-Pearl, was recently commissioned to construct a memorial altarcross of Celtic design for the St. Paul Evangelical United Brethren Church in Wauzeka, honoring the late William and Martha Hazelwood, who were pioneer members of the congregation.

This was a new venture for "Joe," but he attacked the problem with his usual skill and thoroughness, producing a masterpiece, which is truly a work of art, with pieces fitted together so meticulously that in no place is any cement visible. It contains more than 1,000 pieces of "Mother-of-Pearl"—white from Australia and North America, colored from California, black from Tahiti, yellow from the Philippine Islands, and Angel-wing from Japan.

The cross of Celtic design, is seven-

eighths inches thick, 22 inches high, with 10½ inch arms. The IHS design of black pearl is inlaid in white pearl. The circle is made of Angel-wing pearl, showing colors of red, green, blue and yellow. "The beautiful white is symbolical of the purity of our Lord, the red flashes of color symbolical of His blood shed for us, the blue

for courage, the green for growth in Grace and Knowledge of our Lord, and the flashes of yellow symbolical of the fact that He is the "Light of the World," " of all of which the congregation was reminded, by the Pastor at the dedication services in the church on Sunday December 23, 1956.

—B.H.W.

# Basic Principles of Rockology

*by* WILLIAM H. ALLAWAY

IN THE BEGINNING we rockhounds gathered rocks:

(a) Because they intrigued us.
(b) Because we wondered about them.
(c) Because we intended to find out about them.

We have studied a little, prospected a little and collected a little, thereby acquiring a heterogeneous pile of rocks, and as the years rolled by we personally have found out a few things which we will pass along to you, since many requests have been received for information of this type.

Our story will deal with rock and mineral locations, identification, classification and uses, which we hope will help beginners in our hobby to locate and find certain types of rocks and minerals, to identify the specimens they gather, and to classify, display or store them. This as a matter of fact can become a rather long stretched out discourse and for this reason various shapes and groups will be taken up a little at a time.

First you will probably want to know what types of specimens you already have among those which you have picked up at random while out on your earlier field trips. Of course the simplest way to do this would be to invite some person who has been in the hobby for sometime to drop over and look your collection over, or perhaps to gather up a box of specimens and take them to such person, listening carefully, trying to remember what he tells you or recording the information thus received in your notebook.

Before you start, do not forget to clean up your specimens and to paint a little white mark on each specimen as a background for a number. Then as the specimen is identified start numbering 1-2-3-etc. and record in a notebook somewhat as follows:

1. Limestone. Lutz Quarry, Milwaukee, Wis.
2. Agate (Lake Superior). Bellevue, Ia. River. Glacial deposit.

Using black waterproof ink and fine pen, place the number on the white mark on each of the specimens, and you will then have a permanent record, no matter how long or where you may store them or mix them with other specimens. Later as your numbers increase you may find it desirable to transfer this information to a card system which can be alphabetized or otherwise classified.

Lacking a person to whom you may turn for a start at identifying your specimen, then certain basic things must be learned which would also in any event need be acquired if much progress is to be made in your hobby. These basic items start with types of common rocks which divide naturally into three classes:

*1. Igneous or fire rock.
2. Aqueous or sedimentary rock.
3. Metamorphic or changed rock.

We will now take up these main rock classes and try to produce a word picture of the rock fragments of each class starting with the Igneous rocks, but first we must have in mind a concise definition of what is meant by the word rock. Petrologists will tell us that "a rock is a mixture of minerals existing intimately together in indefinite proportions." Simple isn't it?

IGNEOUS OR FIRE ROCKS. Igneous rocks are formations of solid mineral matter occurring naturally in large quantities and produced as the result of the solidification of molten rock either as lava flowing or erupting from a volcano or formed from molten magma as it cooled below the earth's surface. This is the reason why it is called fire rock (igneous) since it is the natural rock on or within the earth's surface that has been produced as a result of cooling of molten rock material.

In this group fall the granites, rhyolites, basalts, obsidian or volcanic glass, perlite, pumice, scoria, cinders, lava, volcanic ash (which has been cemented together by natural cementing agents) and various other forms which are part of one or more of the different varieties.

The types of igneous rocks that are ejected from a volcano as the result of expanding gases released from within are called pyro-elastic rocks. These include volcanic ash, volcanic bombs, scoria, cinders and pumice, as well as many in-between types of material. The types of igneous rocks that flow out of fissure in a volcanic area are usually lava of many varieties, obsidian, perlite, etc.

The types of igneous rocks that form beneath the surface as the magma cools are the granites, basalts and rhyolites, etc. These formations in spaces beneath the surface are called dikes if vertical, sills if horizontal, laccoliths if in small rounded formations, and batholiths if in great formations covering large areas with roots deep into the earth's surface. The roots of mountains are good examples of batholiths.

Igneous rocks such as granite, basalt porphyry and rhyolite can best be recognized by their amorphous appearance—that is, the grains or crystals shown on the surface of the rock will be found to be intermixed in a haphazard manner with no apparent grain or stratification.

These rocks will vary from fine grained crystals requiring a magnifying glass to observe, to coarse grained rocks that took a very long time to cool very slowly beneath the earth's surface, thus giving the crystal material an opportunity to crystallize. They are most useful as building material and for making monuments (tombstones). Igneous rocks such as lava, obsidian and perlite that are formed from molten lava flowing out of a volcanic crater or fissure are recognizable by their glassy appearance. These are called extrusive rocks. The lava takes on many fantastic forms such as ropy, massive, stringy, porous, and even hair like. It may be found in many varieties of colors from light gray or tan to

*Suggest acquiring book entitled "Getting Acquainted with Minerals"—English.

dense black, depending on the mineral content of the lava. Sometimes the presence of iron causes deep reds through all the variations of lavender to light pink.

LAVA proper is porous in texture but fairly heavy, the porous appearance resulting from escaping gases being trapped while the rock was cooling. Lava could also be said to have a sponge-like appearance, but is very hard with sharp splinters that are very difficult to walk on without cutting our shoes. Special shoes should be worn if occasion requires.

OBSIDIAN, which is volcanic glass, also comes in a great variety of colors from light grays to pitch black and as in the case of lava many shades of brick red. It has the appearance of chunks of glass and can be identified by the unusual conchoidal or shell-like fracture that is disclosed when a chip is broken off from the rock. Some obsidian shows a beautiful silver or gold sheen due to the presence of mica fragments that have crystallized out when the rock was cooling. Obsidian itself is like glass, due to the rapid cooling of the molten magma which afforded no opportunity for the minerals contained within the fluid to crystallize. This condition is said to be amorphous (without form).

PERLITE is a grayish colored volcanic glass that is crackly in appearance compared with obsidian and is formed as the result of the incorporation of moisture in the rock when solidifying. Such rock is said to be hydrated. Oftentimes little round nodules of obsidian are found embedded in the perlite which for some reason seemed to have been able to resist the process of hydration and retain the solid form and color of obsidian. These are called "apache tears" and are much sought after as material for jewelry and lapidary work.

PUMICE, SCORIA and rocks formed from volcanic ash show evidence of intense heat which has burned or blown out the heavier minerals and left an extremely porous resi-


due. Pumice is very light in weight and color and looks like a fine grained sponge, whereas scoria is coarser grained and looks more like cinders that are found along a railroad track. Scoria is somewhat heavier and the color is usually gray, although the many varieties of reds show up in regions especially rich in iron.

Volcanic ash is usually light gray, tan or red, and is sometimes found in great layers of rock where whole mountains are formed of this material.

All of these igneous rocks have very similar chemical content and the differences in their structure are due to the manner in which they are formed. By carefully analyzing the coarser grained granite which is

called pegmatite it is possible to distinguish the component minerals from which it is made. Crystals of FELDSPAR will probably be the easiest to identify as a light tan to dark pink material; MICA flakes or blocks will appear in laminated groups; dark crystals of HORNEBLENDE will be peppered throughout the rock, and all of these minerals will be surrounded with QUARTZ which in freezing (solidifying) from the molten mass has acted as the cementing agent in holding the rock minerals together. Quartz can be distinguished by its usually grey vitreous luster. The perfect, flat, shiny cleavage planes of the feldspar help to identify that mineral. Some granites called PORPHYRY cooled to the point where crystals of feldspar can plainly be seen in a clear glassy background mass. These crystals are called PHENOCRYSTS and are caused by slow cooling of the magma which produced the crystals followed by a rapid cooling that froze the crystals in a glassy solid.

WILL YOU PLEASE TAKE YOUR ROCKS OUT OF MY WASHING MACHINE?

In conclusion. Now let us recapitulate; The foregoing information deals with igneous rocks which comprise a large part of that portion of the earth's surface which can actually be studied visibly by man. There are, however, innumerable other rock forming minerals that occur as a result of the forces outlined above, which are deposited in the veins, cracks and fissures of the country rock, called instrusive rocks. Among them are the precious gems, metals and other rare or scarce minerals and elements that occur as the result of combination of certain gases and magma or that have had the opportunity to concentrate in crystal form, and it is in the hope of finding these rarer minerals that prospectors labor. Each of these mineral types must be studied individually so that their character and identity may be known. In the case of the common igneous rocks, however, they can be classified by means of the minerals and elements that form the chief constituents of the magma. These may be grouped to form families of rocks and are therefore called rock forming minerals, as follows:

WE WONDERED ABOUT THE MANY ROCKS WE HAD GATHERED

| ROCK FORMING MINERALS | ACCESSORY MINERALS |
|---|---|
| Quartz | Zircon |
| Feldspar | Magnetite |
| Nepheline | Hematite |
| Sodalite | Pyrite |
| Leucite | Rutile |
| Mica | Corundum |
| Pyroxene | Garnet |
| Amphibole | Illmenite |
| Olivine | Apatite |

The elements that form the chief constituents of magma are oxygen, silicon, aluminum, iron, calcium, magnesium sodium, and potassium.

In a forthcoming issue of EARTH SCIENCE we will next describe sedimentary rocks and tell a few things about their appearance and formation, which will aid us greatly in our appreciation and understanding of them.

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# Flowers of the Mineral Kingdom

*by* E. D. CORNWELL

OF THE SOME 2,000 known minerals, only about 30 separate varieties are used by the jewelers as precious stones. There are, however, about 60 additional varieties of precious stones that are so rare that they never reach the jeweler's counter.

The physical properties of minerals that make them valuable as gem stones are color, luster, dispersion, and hardness. The gem value of some minerals may be attributed to but one of the properties, for example, color, as in turquoise. On the other hand, however, the DIAMOND, RUBY, SAPPHIRE, and EMERALD combine all of these properties and as a result they are collectively prized above all other gems and are commonly known as the PRECIOUS STONES.

For centuries the DIAMOND has been the most highly prized of all gem stones. Before the early part of the 18th century when diamonds were discovered in Brazil, the world's supply had come from placer deposits in India. The Brazilian diamonds were also found in placers and it was not until 1867, after considerable placer mining in South Africa, that diamonds were discovered there in the rock in which they had crystallized. Since this latter discovery, South Africa has been the chief source of gem diamonds.

RUBIES and SAPPHIRES are varieties of corundum. The most valued of the rubies are those having a deep purplish red color, while such a stone of 10 carats or more in size is classed as the most valuable stone in existence. Some of these stones, when viewed in certain light, produce the effect of a six-pointed star and are known as star-rubies.

The finest rubies come from Upper Burma, Siam, and Ceylon. They have been found in the United States in both North Carolina and Montana.

In view of the many SYNTHETIC RUBIES on the market, it becomes of particular interest to us to be able to detect such stones when purchasing an expensive ruby. It is common practice for precious stone experts to examine questionable rubies under a microscope in order to establish their quality and value. At about 60 X magnification a natural ruby will show the presence of tiny rutile needle-like crystals which are always positive proof of a natural stone. Synthetic stones are perfectly clear. It is, by the way, the particular arrangement of these rutile crystals that is responsible for the light diffraction that produces a star-ruby. It is common for these crystals to be running in three different directions within the stone, thus producing a sheen in certain lights giving the appearance of looking at the surface of a spool of silk thread.

While the presence of 1-2% chromium in corundum crystals is responsible for the red color, the presence of 1-2% of a mixture of iron and chromium produces a green color. Although the true SAPPHIRE is blue, all colored corundum stones, other than the ruby-red, are classed as sapphires, some with the name Oriental preceding the name, such as ORIENTAL AMETHYST or ORIENTAL TOPAZ. The golden variety of

the sapphire comes from Ceylon and although it is far more rare, it never brings the price of the deep-blue stone which is always in greater demand.

As with the ruby, the detection of spinal crystals within a sapphire stone is always sufficient evidence to distinguish it from a synthetic product. Another mark of distinction is the presence of a 120° angle between the faces of a natural terminating crystal.

The mineral BERYL serves as a source for the fourth precious stone previously mentioned, namely, EMERALD which is a deep green. As a gem stone, the emerald ranks as the most valuable of all stones and in some cases may have a much greater value than diamonds. However, since the emerald is of a metamorphic nature, it is usually not perfect. In most cases, inclusions within the stone serve to designate its source. Such inclusions, especially microscopic pyrite, are always positive identification of a natural emerald. This inclusion may also comprise a bubble of carbondioxide or even a salt crystal. Such a stone is worth conservatively ten times that of a synthetic stone of equivalent size. For this reason it is most important to be sure emeralds are genuine when they are being purchased. It is common practice to coat a piece of properly cut glass stone with ruby, for example, thus giving the stone the quality of hardness far beyond that of glass. For this reason, no single simple test should be relied upon for final proof of quality. Such coated stones are commonly referred to as "doublets."

Another type of beryl, of somewhat lesser value than the emerald, is AQUAMARINE. This stone is usually blue to sea-green in color and transparent. Other beryls are yellow or golden beryl, morganite, a pale pink, and common beryl which is generally green, yellowish, or greyish white and often mottled.

Among other expensive gem stones is the OPAL, the source being limited almost entirely to Australia. Here mining is done under almost unbearable summer temperatures of 135-140°F. Here it is found lining and filling cavities in igneous and sedimentary rocks, where it has evidently been deposited thru the agency of hot waters in which the silica has been dissolved. The deposit is silicon dioxide, like quartz, with varying amounts of water. Whenever the water content of the deposit is too high, it is then impossible to cut and polish gem stones from it. Opal is not crystalline in structure, but of an amorphous nature. It is a mineraloid. It is a very fragile stone and as a result should be worn with great care as it is easily chipped or broken. It is common historical knowledge, of course, that the opal has a background and a reputation of being a "bad-luck" stone through the ages.

Other gem stones, worthy of mention are:

JADE is a microcrystalline, fibrous material, made up of two compounds known as Jadite which is similar to spodumene and Nephrite, a form of Actinolite. Of these two, Nephrite is the more common variety of Jade. The green color is due primarily to the presence of ferrous iron. The outstanding physical characteristic of jade is its toughness.

The TOPAZ, an aluminum fluosilicate. It was formed through the agency of fluorine-bearing vapors given off during the last stages of the solidification of igneous rocks, commonly occurring in cavities in rhyolite lavas and granite.

The color of the stones varies, being colorless, wine-yellow, golden-brown, pale-blue, and pink. The pink color is mostly artificial, being induced by gently heating the dark yellow stones. The Topaz is not considered to be of much value as a gem stone.

CAT'S-EYE is a yellow form of Chrysoberyl, more particularly of Alexandrite, which is an emerald-green stone that appears red by transmitted light. Cat's-eye shows an opalescent luster when polished, changing color or shade with every movement of the stone. The effect is most accentuated when the stone is cut in the form of a cabochon. This property is thought to be due to numerous minute tube-like cavities, arranged in parallel structure. As a result, its quality is quite a function of the manner in which it is cut.

Cat's eye should not be confused with TIGER'S-EYE which is altogether a different material, being a much softer fibrous quartz from South Africa, which is pseudomorphic after the fibrous mineral crocidolite, commonly known as a blue-asbestos.

*(To be continued)*

## MIDWEST CLUB NEWS

BERNICE WIENRANK, CLUB EDITOR
4717 Winthrop Avenue, Chicago 40, Ill.

JOLIET MINERALORISTS at its January meeting heard Prof. Harry Adams lecture on "Gemstones." With the aid of pictures, diagrams and actual specimens, Prof. Adams carried his audience through the various steps of creating a gem from rough stone. For an hour and a half his listeners scarcely moved, they were so interested.

*

CINCINNATI MINERAL SOCIETY and the DRY DREDGERS at a joint meeting in January heard Dr. Kenneth E. Caster, professor of geology, University of Cincinnati, give an illustrated lecture on the geology of Tasmania. Dr. Castor, who recently returned from a study of Tasmania under a grant from the Fulbright Foundation, related that the geology of Tasmania proved to be quite complex, and involved early lava flows, mountain building and folding. There is a similarity between the mountains there and our Appalachians. It was also found that the fossils of Alabama resembled those found in certain sections of the Island. Strong evidences remained of glaciation during the Cambrian, Devonian, Carboniferous and Pleistocene periods. Tasmania was once a part of the Australian mainland, and is largely an unexplored country, with rugged terrain and an annual rainfall of 200 inches.

*

CENTRAL ILLINOIS ROCKHOUNDS will hold an exhibition of gemstones, jewelry, minerals, Indian relics and shells on March 30-31. Visitors are cordially invited. This annual exhibition draws a wide attendance from Decatur and nearby towns and is both educational and entertaining.

*

CHICAGO LAPIDARY CLUB on March 7, heard Edward Mulcrone, of the Chicago Police Department, talk on "Stolen Jewelry." Officer Mulcrone cautioned his audience that stolen articles must be identified before they can be recovered and then instructed them in the proper method of identifying jewelry.

*

MICHIGAN MINERALOGICAL SOCIETY on February 11 was given an informative lecture on "Collecting Fossils", by Herbert Tischler of Wayne State University. Mr. Tischler described in particular fossils that could be collected from the quarries in the Detroit area.

*

EARTH SCIENCE CLUB OF NORTHERN ILLINOIS soared into outer space on March 8 via an interesting and authoritative lecture on "Constellations, Earth Satellites and the International Geophysical Year," by Ben A. Benson, of the Chicago Astronomical Society. Mr. Benson, who is a professional illustrator and designer, studied astronomy at the University of Nebraska and is experienced in adult educational work in astronomy.

*

CHICAGO ROCKS AND MINERALS SOCIETY'S guest speaker on March 9 may well have been a jinni from the "Arabian Nights," for he brought with him beautiful castles made of semi-precious stones. Speaker Leo J. Cieminski discussed and displayed the lovely castles that he built from gem materials which he collected in his travels. The castles have fences made of onyx, opal entrances, balconies of petrified wood, rose quartz floors, golden fluoride spires, pearl domes and agate arches. They are inhabited by alabaster royalty, who are seated at tables carved from tiger eye.

*

WISCONSIN GEOLOGICAL SOCIETY on January 14 heard Arthur Bunyan give an illustrated talk on "Aruba, Jewel of the West Indies." Mr. Bunyan, a former resident of the lovely island of Aruba, which lies off Venezuela, made his audience forget the sub-zero weather outside and made them actually feel as if they were having a holiday in beautiful Aruba.

*

MICHIGAN GEM AND MINERAL SOCIETY on February heard member Jerry Hudechek talk on "Fluorescent Minerals," and viewed his breathtaking display of fluorescent minerals under both short and long wave ultra violet rays. Mr. Hudechek is an authority on fluorescent minerals and at present is assisting the Kingman Museum of Natural History at Battle Creek, Mich., to set up its fluorescent mineral exhibit. It is reputed that this exhibit will be one of the finest fluorescent displays in the Midwest.

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EVANSVILLE LAPIDARY SOCIETY celebrated its fifth anniversary at its January meeting. The club has made great progress since it was organized in 1952. It is now nationally known; its members are in great demand as speakers at other clubs; its exhibits have taken many honors; it publishes a very fine newsletter; and it has its own work shop.

*

MARQUETTE GEOLOGISTS ASSOCIATION on February 2 heard Mr. K. B. Ross give an illustrated lecture on "Processing Quartz Crystals for Use in Radio." These crystals are used to hold the receiving and broadcasting of radio to a given frequency.

ST. LOUIS GEM AND MINERAL SOCIETY on March 1 featured a quiz program, complete with a panel of experts and a moderator. Questions fired at the panel from the audience proved that all the experts on minerals were not on the panel.

*

AUSTIN GEM AND MINERAL SOCIETY reported in its bulletin, *Achates*, that members Mr. and Mrs. Julius Shade, while agate hunting in zero weather last December, stumbled on an unusual crystal formation. The specimen was composed of hundreds of small, needle-like crystals, tightly interlocked, and a few small six-sided stars. Closer examination revealed that they belonged to the hexagonal system; the molecular architecture was truly a thing of beauty. Trembling with excitement, Mr. Shade wrapped the specimen carefully and placed it in his car.

Returning home, Mr. Shade placed his treasure in the kitchen sink to wash and clean it. Deciding first to have a cup of hot coffee and to try to find some description of his new find, he retired to his library. Several cups and volumes later, with no success at identification of his specimen, Mr. Shade went to the kitchen sink to find his crystals completely melted and down the drain!!!

*

RAWLINS ROCKHOUNDS elected the following officers at its January meeting: Ned Cross, president; Gail Willis, vice president; Peg Miller, secretary-treasurer; Duke Parrish, corresponding secretary.

The society meets the second Tuesday of each month in the Court House, Rawlins, Wyo.

*

COMPTOM GEM AND MINERAL SOCIETY on February 7 held a "nickel" auction (also called Dutch auction). Material collected from members was auctioned off in the following manner: A time clock was set to go off in less than a minute, and then the bidding started. All bidding was by nickels; when the alarm sounded, the person handing the auctioneer a nickel received the specimen. All nickels collected went into a fund for future programs.

*

WICHITA GEM AND MINERAL SOCIETY will hold its fourth annual Gem and Mineral Show, April 27-28, in Kansas National Guard Armory, Wichita, Kan. The show is non-competitive and members of other gem and mineral clubs are invited to display. Special features will include a mineral identification service and working exhibits of lapidary and silversmithing.

*

MINNESOTA MINERAL CLUB will hold its annual exhibit of gems, minerals, fossils and artifacts on April 14 in the Coffman Union ballroom, University of Minnesota campus. The show put on by the club each year is truly a "spectacular" and numbers its attendance in the thousands. Visitors are cordially invited.

MISSOURI ARCHAEOLOGICAL SOCIETY learned why, when and how to make a descriptive classification of Indian arrowheads, when Richard Marshall, of the University of Missouri, spoke to the group on "Classification of Points," on February 6. Mr. Marshall stressed the fact that one of the most important parts of a scientific report is the presentation and description of the material, because upon this description rests the success of the comparisons of materials which lead to conclusions.

*

DES MOINES LAPIDARY SOCIETY on January 19 honored and surprised club members Roy and Sue Bennett on their golden wedding anniversary with a "This is Your Life" program, in which it featured screened pictures of the Bennetts from the time they were married to the present. Special gifts from the club included a gold nugget from Central City, Colo.; a beautiful gold sheen obsidian necklace, designed and made by Gus Brown and a large open St. Francis geode, lined with pink crystals and serving as a horn of plenty for fifty silver half dollars covered with gold foil.

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